

Teaching philosophy

When I think of teaching the first thoughts that come into my mind are convey of knowledge and development of critical thinking skills. When I am in front of my class, however, I think of students' backgrounds and diversity. Furthermore, when I see beyond my students, I think of motivation and open mindedness.

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My main goals for the students are to have them learn the facts and principles related to mechanical engineering, to learn how and when to apply them, and to understand why we are learning all that. An example of one of my classes is as follows. I introduce first a new concept, such as friction. I give an everyday life example such as dragging a box, and then I show and explain the mathematical model to compute friction. Next, I present several cases where friction is relevant and show how to solve the problems using the mathematical model. After that, I ask each student to solve more challenging problems, and then I ask them to discuss their solutions with one or two classmates. I go around the students to see how they are doing and answer any question that may arise in the meantime. Finally, I ask some of the students to present their solution and ask them to explain why they solved it in that way. If there is more than one solution or more than one way to solve it (which I force by the choice of the problem), it is discussed. At the end of the class, to assess the learning process in my students and my own teaching methods, I ask each student to write anonymously in a sheet of paper the two ideas taught in class they think are the most important, or an example where friction is important in their houses, or what they have learned, or what they have not learn based on their expectations from the syllabus.

As an instructor, I have learned that there are several ways to motivate the students. First, the students need to be convinced that what they are learning in class is important for them; second, I need to give responsibility to the students to bring something to the class; third, the students need to feel that they belong to a community (the class group) and therefore they are responsible for each other; and fourth, the content of the class should not be the only variable parameter in the class. The first issue I usually address it by bringing daily life examples and hand-on experiences, combined with a final project where students need to solve or improve a mechanical engineering situation they may notice around them and which can be solved by using the knowledge acquired in the class. The second and third issues, which are related to students' responsibilities in the class, I address them by making the students feel that the class belongs to all of us and not only to me. I may ask the students to take turns to solve problems on the board, and ask others to give feedback; ask the students to solve assignments to be graded in groups, and that only one of them (randomly selected) will have the opportunity to explain the solution on the board; assign responsibilities to specific students such as writing down notes which will be shared with others, distributing course material, and keeping track of the turns in going to the board. The fourth issue is my favorite because I believe

creativity and discovery are important skills in an engineer. I try to bring something new to each class: a new active learning method, Power Point slides, a guest lecturer from a local industry (from GM for example), a poster displaying a current research related to the topic of the day or as a topic for a potential final project, RF equipment to record students' feedback, virtual discussions, etc. In my graduate classes I focus heavily into creativity and discovery, not necessarily by bringing something new on each class, but by arousing curiosity when presenting my own and others' research work.

Parallel to the idea of discovering new things as an engineer is the idea of discovering new minds and cultures. Similarly, parallel to learning analytical and evaluating skills as an engineer, is learning to understand and/or tolerate other people's point of view. All these skills are important to excel as professionals and therefore to fit in the community. As I mentioned before, I believe the classroom setting is one of the best to learn community building. In my classes I try to expose the students to different situations including interacting with classmates with different backgrounds (race, ethnicity, gender, technical knowledge, learning style, etc.), taking different roles when working in teams (leader, note taker, report writer, etc.), and taking different roles when working individually (presenter or evaluator). By doing so, I hope to provide the students the opportunity to learn not only the theory of mechanical engineering and problem solving skills, but also that around them there is much to learn as well.